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CANADIAN GROWN GRAINS

IN

POULTRY FEEDING

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The complete elimination of corn and corn products from the ration should be attempted only when satisfactory substitutes are available, but in any case the proportion may be reduced from that used in most of the generally accepted rations.

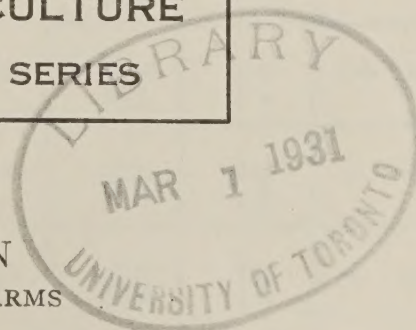
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CANADIAN GROWN GRAINS IN POULTRY FEEDING

During the past few years there has developed a marked tendency towards the increased use of home grown grains in poultry feeding. This development may be explained mainly by the desire to make use of grains actually grown on the farm, since market conditions have recently so far reduced prices of these grains as to make their marketing through the medium of animal products highly desirable. In addition, a natural preference for Canadian grown as opposed to imported feeds has led to a well marked desire for suitable rations in which the readily procurable grains may substitute in great measure for imported feeds. The relatively high price of corn at the present time, due to a greatly reduced yield in the United States, is a further incentive for the use of Canadian grown grains.

In so far as poultry work is concerned corn and corn products are the only feeds which are imported to any considerable extent. Almost without exception, all other products are Canadian grown grains or the products of farm animals or of the abattoir.

The Relative Feeding Value for Poultry of the Most Commonly Used Grains

By far the greatest proportion of poultry rations is made up of combinations of the following grains, namely wheat, oats, corn and barley, or their by-products plus such supplements in the form of minerals, proteins and vitamin feeds as have been found necessary to provide for maintenance, and growth or production as required. The following tabulation represents both chemical analyses and digestible nutrients of the grains under consideration. Digestible nutrients for poultry are used in every case.

CHEMICAL ANALYSES AND DIGESTIBLE NUTRIENTS OF WHEAT, CORN, OATS AND BARLEY

* Nutrient	Water	Ash	Crude protein	Carbohydrates		Fat	Vitamins	
				Fibre	N Free extract		A	B
<i>Wheat:—</i>								
Total analysis.....	10.2	1.9	12.4	2.2	71.2	2.11	—	++
Digestible.....	10.2	1.9	9.3	.....	62.7	1.2		
<i>Corn:—</i>								
Total analysis.....	10.5	1.5	10.1	2.0	70.9	5.0	++	++
Digestible.....	10.5	1.5	8.2	.....	64.7	4.4		
<i>Oats:—</i>								
Total analysis.....	9.2	3.5	12.4	10.9	59.6	4.4	—	++
Digestible.....	9.2	3.5	8.8	.....	53.7	3.9		
<i>Barley:—</i>								
Total analysis.....	9.3	2.7	11.5	4.6	69.8	2.1	—	++
Digestible.....	9.3	2.7	9.0	.....	60.0	1.4		

* Derived from Henry and Morrison "Feeds and Feeding" 1928; Maine Bulletin 184; U.S.D.A. Bulletin 56, Okla. Bulletin 46.

The above analysis throws light upon the comparative value of the different grains and also upon the availability of the different nutrients in so far as

poultry are concerned. In contrasting a home grown grain with an imported one, wheat and corn may be considered as being closely identical in analysis. It is interesting to note that wheat is superior to corn in analysis, both crude and digestible. Both the protein and carbohydrates of corn are more digestible than those of wheat but the latter grain contains the greatest percentage of both digestible protein and carbohydrates.

Since barley is the grain generally substituted for corn in feeding practice a comparison of the two is interesting. It will be seen from the above table that barley is superior to corn in content of minerals (ash) and protein both crude and digestible. Corn is slightly superior in carbohydrate content and also in being low in fibre.

Both oats and barley are excellent grains particularly as to protein and ash content. The high fibre content of both, and particularly of oats, reduces their value somewhat as poultry feeds. Since laying and growing fowl commonly digest foods in from three and one-half to four hours it is quite impossible for any appreciable amount of fibre to be broken down and digested during this period, hence a feed high in fibre slows up digestion and supplies no nutrients available for use. Consequently when oats or barley are fed they can make up but a comparatively small proportion of the ration and when fed in combination the percentage must be still further reduced.

In so far as vitamins are concerned all four grains are good sources of vitamin B, considering this to be the anti-neuritic vitamin, the presence of which prevents the occurrence of a deficiency disease known as poly-neuritis in fowl, and corn is the only one which contains the growth producing anti-ophthalmic vitamin A which is of importance in poultry work particularly where growing stock is concerned and in the prevention of ophthalmia, a deficiency eye disease not uncommon to poultry. Both greenfeeds and cod liver oil are a good source of this latter vitamin and since both are commonly fed in poultry rations any lack of this vitamin in the cereal grains can be readily offset by the addition of suitable supplements to the ration.

Certain other home grown grains such as buckwheat, peas, and sunflower seeds are used to a limited extent particularly in scratch grain mixtures where they may be used to advantage to add variety to the ration.

Research Work in the Substitution of Home Grown Grains for Imported Grains, Upon the Experimental Farm System

As early as 1923 it was realized that the use of home grown grains for poultry feeding, rather than imported and more expensive feeds was a problem meriting special consideration in an investigational way. Since in many outlying districts barley was plentiful and cheap and corn relatively expensive and difficult to obtain the substitution of barley for the latter grain was the main feature of experiment, while in a few instances tests were also made with oats as a substitute for corn. Three tests were also carried out with satisfactory results, substituting potatoes for corn meal in fattening.

Since that time thirteen of the Branch Farms of the Experimental Farm's system situated in all provinces of the Dominion, as well as the Central Farm at Ottawa, have carried on experimental work on the substitution of home grown grains for corn and corn products. Considering twenty-six separate experiments over a period of seven years, a great deal of variation in results obtained has occurred, there being thirteen cases in which corn gave superior egg production, eleven in which barley was similarly superior, and two cases in which there was nothing to choose between the two. In practically no case was there a great difference between the two except where the ration had not been sufficiently well supplemented by greenfeeds and cod liver oil to make up

for the vitamin A deficiency of barley as mentioned above. In one instance barley gave quite inferior production to corn except during the last three years when good quality alfalfa leaves and blossoms and cod liver oil were fed to the barley pen, when the barley ration became equally as efficient for egg production.

All other things being equal, the important feature of the work from the standpoint of the poultryman is the economy of production that may be attained through the use of barley rather than corn. In a great many instances where corn gave superior production to barley in the experiments under consideration, such production was at a greater cost.

It is apparent from the above discussion that corn may be expected to give slightly superior results to barley for egg production, *but when the vitamin deficiency of the latter grain was counteracted by suitable substitutes to the ration such as cod liver oil and suitable green feeds, barley became equally efficient for egg production.*

The complete elimination of corn and corn products from the ration should be attempted only when satisfactory substitutes are available, but in any case the proportion may be greatly reduced from that used in most of the generally accepted rations.

Suitable Poultry Rations

BROODING RATIONS

Experiment has shown that the early stage of the chick's life, or that during which what are known as "starter feeds" are fed, is the critical period in so far as nutrition is concerned. Consequently the compounding of rations for this period, ordinarily the first eight to ten weeks of the chick's life, requires great care. The ration given herewith has consistently given satisfactory results at the Central Farm.

A commercial chick scratch is used during this period, owing to the fact that all grains used must be so finely cracked that such a mixture can not be suitably prepared upon the farm. It is usually fed morning and evening, the latter feeding giving much the larger quantity.

The mash consists of equal parts of shorts, middlings, finely ground yellow corn and oat flour (ground oat groats). The animal feed mixture makes up from twelve to fifteen per cent of the mash and consists of meat meal, fish meal, bone meal and milk powder in the proportions of two of meat meal to one of each of the other ingredients. One per cent of common salt and one to two per cent of cod liver oil, depending upon the amount of sunlight available to the chicks, completes the mash.

The greater the variety of animal foods the more likely is the mash to be complete in quality of proteins and particularly in the diversity of amino acids, the absence of certain ones of which make a protein mixture quite unsuitable to maintenance and growth. If the above variety is not available meat meal may make up the bulk of the mixture with fish meal and milk powder the next greatest in proportion. The amount of milk powder used is ordinarily governed by the cost, which is quite high, while recent research has shown that bone meal should not exceed from two to three per cent of the ration.

As pointed out above, owing to the chick's comparatively tender digestion at this stage the caution as to keeping down fibre in the ration applies particularly at this time. As a consequence it is suggested that barley should not be substituted for corn meal to any extent in the starter ration. Also, the consumption of starter mash is so small relatively that practically no saving would be made by such substitution.

REARING RATIONS

Very little change in the ration is made during the rearing period. The grain mixture may consist of wheat, oat groats, barley and cracked corn, with wheat being double the next greatest ingredient. The cracked corn may be eliminated at this time or merely reduced in proportion as barley is added.

The rearing mash is similar to the starting mash except that bran is substituted for shorts and barley meal for all or part of the corn meal. The percentage of animal feeds is also varied according to sexual maturity. Where pullets show signs of too rapid sexual maturity the percentage of animal feeds is decreased and the amount of scratch grain fed is increased.

It is important to note that where skim-milk or buttermilk is available in such quantities that they have all they will consume, with no water to drink, the animal feeds may be eliminated entirely from the mash.

RATIONS FOR EGG PRODUCTION

The laying ration is also quite similar to the above, the scratch grain mixture being identical. In the mash good quality alfalfa leaf meal is substituted for one half of the bran and ground whole oats for the oat flour of the "starter" mash.

If barley is fed in place of corn the proportion both of ground oats and barley must be greatly reduced to cut down fibre. The animal feeds are similar to those of the starter ration and make up ordinarily 15 per cent of the mash. The limitations as to percentage of milk powder and bone meal given in considering "starter" mashes also apply here. Cod liver oil and salt are also given at the same levels. When skim-milk or buttermilk is available the amount of animal feeds is reduced proportionately to the milk available.

In feeding for egg production the apparent condition and body weight of the birds is the principal guide. If the birds are in good production but are not maintaining body weight an increase in the proportion of scratch grain fed is indicated. Conversely, mediocre production and a tendency to sluggishness and too great weight, particularly in the general purpose breeds, is an indication for reduction of scratch grain with a resultant increase in mash consumption which will cause a return to laying condition.

Summary

Owing to present economic conditions which have resulted in extremely low prices for Canadian grains, and to the consequent need for the marketing of these grains through animal products, the data herein contained are presented:—

(1) Rations featuring home grown grains to as great an extent as is advisable and which have given satisfactory results in actual practice are given.

(2) The relative feeding value for poultry of the commonly used grains is discussed with both total and digestible analyses of each. The characteristics of each grain and their relation to poultry nutrition are discussed.

(3) Research work conducted by the Poultry Division of the Dominion Experimental Farms is summarized and forms the basis for the recommendations as to substitution for imported grains as herein set forth.

(4) The substitution of barley and barley products for corn and corn products is suggested, the limitations of such substitution pointed out, and recommendations made as to maintenance of proper balance in the ration under these conditions.

